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AUTHOR Salazar, Irene M.
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ABSTRACT

A survey administered to junior and senior high school students was studied to determine the degree to which the narrative from the "additional comments" section of the survey enhances the quantitative data analysis from the survey. The data, obtained as part of a needs assessment for a suburban school district, were obtained by using the High School Student Opinion Survey (HSSOS) of the American College Testing Program, 1980. The HSSOS was administered to 371 twelfth graders and 309 eighth graders. Focus was on the High School Environment, High School Characteristics, and Comments and Suggestions sections of the instrument. Qualitative data were submitted to quantitative and holistic content analysis as well as value analysis. Results provide positive evidence to support the use of a less systematic approach to the content analysis of qualitative data obtained via instruments such as the one used in this study. Cost-effectiveness analysis provided a summary of the findings of the study in terms of cost, adequacy, and enhancement. Eight tables are provided. (TJH)

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# THE USE OF QUALITATIVE DATA AS A SUPPLEMENT TO QUANTITATIVE ANALYSIS OF OBJECTIVE SURVEY ITEMS

Irene M. Salazar
University of Pittsburgh
Learning Research and Development Center
Pittsburgh, PA 15260

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# The Use of Qualitative Data as a Supplement to Quantitative Analysis of Objective Survey Items

## Introduction

The objective of this study is to investigate the degree to which the narrative from the 'additional comments' section of a survey administered to junior and senior high school students, enhances the quantitative data analysis of that same survey. Does that enhancement differ by grade level of the respondent? What are the implications for methodological treatment of the qualitative data, and how might this be related to time and cost factors?

As Patton (1980) suggests, writing ability of the respondent is thought to influence the richness of the qualitative data. It may be that the writing ability of the junior high school student is not yet refined enough to elicit the kind of creative expression sought in the open-ended section of the survey. The implication here lies in the selection of an approach to the analyzing of the qualitative data. Should the evaluator spend the time carefully and tediously content-analyzing the open-ended comments, or would a general, more holistic approach to the data be more efficient? This more general approach would require less time, and in the case of the evaluator acting as a private consultant, (receiving hourly compensation for time spent) would result in less cost to the school district.

Recently, the integration of qualitative data analysis into the field of educational research has received much attention. Researchers (Cooley & Bickel, 1986; Patton, 1980) are suggesting the use of multiple methodological probes and are acknowledging the benefits of being methodologically eclectic. Cooley and Bickel (1986) write that "no single educational method for the investigation of educational phenomena in educational settings is inherently superior in all research contexts" (p. 42). Similarly, other researchers (Campbell, 1974; Cronbach, 1980; Fetterman, 1987; Reichart & Cook, 1979; Trend, 1979) have discussed the movement away from the traditional quantitative approach to educational research and have related the need to integrate quantitative and qualitative data analysis to provide depth of understanding and to increase external validity to the research undertaken.

But to what extent is this depth and detail beneficial in a program evaluation setting? How much new information is provided and at what cost, monetarily and/or time wise? In a report on the relationship between politics and evaluation, Chelimsky (1987) relates that "given a choice between timeliness and powerful methodology..., [legislative] staff will generally choose timeliness" (p.13). In her summary on what has been learned about the politics of program evaluation, Chelimsky (1987) concludes that "evaluators must try to achieve a balance among timing, methodological strength, and cost" (p.18).

## Methods

Data source. The data for this study were obtained as a part of a needs assessment in a suburban school district. The total K-12 enrollment of the district is approximately 5000 students. The students are generally from middle to upper-middle class socio-economic backgrounds. Academically, they rank average to above average on the national percentiles of the Stanford Achievement Tests.

In this district, the High School Student Opinion Survey (The American College Testing Program, 1980) was administered to 371 12th grade students and 309 8th grade students. The survey consists of seven general sections: (1) Background Information, (2) High School Environment, (3) Occupational Preparation, (4) Educational Preparation, (5) High School Characteristics, (6) Additional Questions, and (7) Comments and Suggestions. Of particular interest to this study are the High School Environment, High School Characteristics, and Comments and Suggestions sections.

The High School Characteristics section contains 21 statements that ask for responses indicating a degree of agreement. Each response to an item is coded numerically on a 5-point Likert scale. The higher the rating, the stronger the agreement. The High School Environment section contains 40 items divided into five subsections. These subsections are titled: (1) Instruction, (2) Activities, (3) Guidance and Counseling, (4) Facilities, and (5) General. Each item calls for a response indicating the degree of satisfaction on a 5-point Likert scale. The final page of the survey form calls for additional comments from the students. More specifically, the survey indicates, "If you wish to make any comments or suggestions concerning this school, please use the lines provided below" (p.4).

For the purpose of the needs assessment, the results of the objective items of the survey were analyzed in a quantitative fashion. Descriptive statistics were presented in a final report. The results of the open-ended comments were content-analyzed and presented in narrative form. The frequency and percentage of occurrence of comments within a category were included in the narrative.

Procedures. For the purpose of this study, three types of qualitative data analysis were conducted on the narrative statements written by the junior and senior high school students. First, a systematic (Smith,1987) content analysis was done. The intent of this analysis was to "objectively" report on the nature of the comments by coding, counting, and verifying "meaning units" (Tesch, 1987) of the text. Although the topics examined by the objective items of the survey served as a focus for categorization, these topics were not pre-defined as the exclusive categories into which the text would be coded. A frequency count of statements was made, and a table of the number and percent of statements per category was organized. A narrative summary of the

analysis was prepared to elaborate on the numerical coding of the data. The summary was supplemented with actual quotes of the students.

Reliability of the coding process was checked according to the "double-coding" method detailed by Miles and Huberman (1986). Two researchers coded the data separately. A comparison of coding agreements and disagreements was calculated to estimate intercoder reliability. A 95% and 96% intercoder reliability was calculated for the junior and senior high school data, respectively. Both researchers also recorded the amount of coding time and writing time for completing the data analyses.

The second type of content analysis was designed using a holistic approach. Two additional researchers were asked to read each data set and write a summary report for each grade level. Each researcher was provided with the original quantitative report of the objective survey items. The researchers were asked to record general notes on the material they were reading. They were specifically asked not to do a categorization and detailed frequency count of the number of comments within a particular topic that may arise. Their main task was to provide a general report on the highlights of the student comments. The intent of this type of approach was to utilize a method of data analysis that could provide adequate information for making recommendations in considerably less time than a systematic content analysis. The time spent on the reading of the data and the writing of the reports was logged by both researchers. The reliability of this method was checked by comparing the similarity of the content of the reports. The reports written from the systematic content analysis were also included in this analysis. Although a high reliability was indicated in the coding of the systematic analysis, a similarity of the written summary reports does not necessarily follow. Emphasis on different aspects of the statements within a category and the use of different quotes to detail the report could produce a report biased by the viewpoints of any one researcher. In order to test the reliability of the summary reports written by the four researchers, forty raters, twenty for each of the two grade levels, were asked to rate the similarity of the reports in their presentation of the survey results. In addition, raters were asked to compare the reports of the holistic and systematic analyses. A two-way repeated measures analysis of variance was performed with 3 levels of the repeated measure and an order effect as the between group effect. The three levels of the repeated measure consisted of the following comparisons:

1. A single rating comparing the reliability of the reports of the systematic content analyses.

2. A single rating comparing the reliability of the reports of the holistic content analyses.

3. A single rating comparing the similarity of the reports written from the two different approaches (i.e., systematic and holistic).

The results of the reliability analysis show no significant difference in ratings of similarity at the .05 level of significance (F=.95; df=2/32 for the junior high; F=2.29; df=2/32 for the senior high). The ratings were based on a scale of 1 to 5 where:

1=Not at all alike
2=mostly different ideas presented
3=basically the same ideas presented
4=mostly similar ideas presented
5=exactly alike.

The mean ratings for the report comparisons are as follows:

TABLE 1

Mean Ratings for Report Comparisons
by Grade Level

| | Grade Level | |
|---|---|---|
| | Junior High | Senior High |
| Approach | Mean | Mean |
| Systematic to Systematic | 2.75 | 3.10 |
| Systematic to Holistic | 2.55 | 2.90 |
| Holistic to Holistic | 2.40 | 2.60 |

The means for this analysis fall between 2 (mostly different ideas presented) and 3 (basically the same ideas presented) with an overall mean rating of similarity of 2.9 for the systematic approach, 2.7 for the systematic to holistic comparison, and 2.5 for the holistic approach.

Raters were also asked two additional questions: (1) to what extent does each report provide adequate information for recommending improvements in the school system, and (2) to what extent do the details of each report add to the information presented in the quantitative summary of the objective items of the survey. The results of these statistical analyses will be presented in a later section of the paper.

The third type of content analysis conducted was also systematically approached. The purpose of this analysis, however, was not to provide a reflection of the content of the student narrative. Instead, it was designed to explore the value of the statements written by the students for the purpose of providing useful information that could lead to improvements in the students' quality of life in the school environment.

For each student's narrative, the total number of information units were counted. An information unit is defined as a statement or statements that express a meaningful opinion to the researcher. The statement(s) may be a phrase, or a complete sentence or sentences. These units were then coded into three categories: exact matches, paraphrased comments, and elaborations. An "exact match" is a word-for-word repetition of an objective item on the survey. An example of an exact match is "There are too many required courses"(p.3). On the

objective section of the survey, this exact statement is presented and the student is asked to respond with a rating of agreement using a 5-point Likert scale. In the "additional comments" section, the student rewrote this same item as a comment. From these kinds of "meaning units", no additional information can be obtained that has not already been provided in the objective section of the survey.

A "paraphrased unit" is a re-writing of an objective item so that, although the words of the student's comments are not exactly the same as the original objective item, the conveyed meaning is the same. Examples of paraphrased comments are "I don't think that it is easy enough to reach the counselors" or "You should be able to get a schedule change when you want". The objective items that were paraphrased are items that ask for a rating of satisfaction on the "availability of counselors"(p.2) and a rating of agreement on the statement "It is easy to change your class schedule when necessary"(p.3). As with the case of the exact matches, little additional information for making formative evaluation recommendations is provided.

The final coding category defines the information that may be thought of as the depth and detail provided by the qualitative data. This category is labeled "elaboration" and is divided into three sub-units. An elaboration is a unit of information that is founded in one of the objective statements. It provides additional details that are not conveyed by the item and its accompanying rating. Three types of elaboration are defined: definitely helpful, possibly helpful, and not helpful. "Definitely helpful" elaborations provide bits of information that deal with possible illegal, immoral, or unethical behaviors. Even though only one or two students may report on such a behavior, some type of follow-up investigation would be undertaken if a comment under this category had been written. "Non-helpful" elaborations are statements that, most likely, would not be considered in the formation of recommendations for improvement. These statements either supply details that are wordy examples of a matched or paraphrased statement or offer suggestions that do not coincide with the financial, moral, or ethical value system represented by the typical decision makers in the school system. Examples of non-helpful elaborations are:

> "The athletic program offers you a lot of sports. For instance, football, basketball, baseball, soccer, skiing,and cheerleading. There are probably more that I don't know about."
>
> "There should be an elevator or escalator so that we don't have to walk up and down the steps."
>
> "There shouldn't be any handicapped people in this school."
>
> "I enjoy being around the kids, but some are intolerable".

"Possibly helpful elaborations" is the category into which most of the elaborations fall. These are the statements that provide details about an objective item that could be considered in the formation of

recommendations for improvement. They are basically the non-extreme elaborations written by the students.
A reliability check on this type of coding system was done on a randomly selected twenty percent sample of data. The rate of coding agreement was calculated to be 93%.

Data analysis. In order to look at the degree of enhancement that is provided by the student comments, an average student profile was calculated from the data collected on the "value" content analysis. Descriptive statistics on the categories provides a view of an average student comment section. The raw data representing the student profile however, is a bit difficult to comprehend as it includes fractions of whole numbers that are inconsistent with our typical view of the English language. For this reason, both raw data and percentages are included. Tables 2 and 4 depict these values.

TABLE 2

Descriptive Statistics Showing the Components of a Typical Student Comment Section by Grade Level

| | Grade Level | | | | | |
|---|---|---|---|---|---|---|
| | Junior High School | | | Senior High School | | |
| Category | Mean | Median | Mode | Mean | Median | Mode |
| EXACT MATCHES | .04 | 0 | 0 | .02 | 0 | 0 |
| PARAPHRASES | 1.25 | 1.0 | 1.0 | 1.28 | 1.0 | 0 |
| NON-HELPFUL ELABORATIONS | .40 | 0 | 0 | .26 | 0 | 0 |
| DEFINITELY HELPFUL ELABORATIONS | .01 | 0 | 0 | 0 | 0 | 0 |
| POSSIBLY HELPFUL ELABORATIONS | 1.60 | 1.0 | 1.0 | 1.93 | 1.5 | 1.0 |

The statistics in Table 2 were calculated using student comment sheets that contained written comments rather than on the total sample of students. Since only 50% of the senior high and 83% of the junior high students actually recorded comments, the inclusion of data (i.e., zeros) for the papers with no comments would significantly lower the obtained mean values. As we are evaluating the time and cost factor involved in performing a content analysis, and negligible time was spent on these blank papers, a decision was made not to include these papers as a part of the analysis.

A look at the descriptive statistics presented in Table 2 reveals some information about the distribution of these variables. A comparison of the mean, median, and mode shows the positively skewed nature of the distributions. Most of the student papers did, in fact, have a short narrative with only a few students recording a full paragraph of information. The range of total units counted per student was from 1 to 12 for both the junior and senior high. The highest mean at both grade levels is in the "possibly helpful elaboration" category, reflecting a typical student paper as having an average of 1.6 (junior high) and 1.93 (senior high) helpful elaborations. In the "definitely helpful" category, only the junior high comments contained data.

A comparison of the difference in student profile was done by performing a 2-way repeated measures analysis of variance on the data. Due to the positively skewed nature of the variable distributions, a log transformation of the data was utilized. Assumptions of normality and homogeneity of variance were checked after the transformation and found to be in congruence with the statistical analysis. The data were compared using two broad categories, non-helpful and possibly helpful information. The original coding categories (i.e., matches, paraphrases, and elaborations) were regrouped as follows:

| POSSIBLY HELPFUL COMMENTS | NON-HELPFUL COMMENTS |
|---|---|
| definitely helpful elaborations | matching |
| possibly helpful elaborations | paraphrasing |
| | non-helpful elaborations |

The results of the analysis are presented in Table 3.

TABLE 3

Two-Way Repeated Measures Analysis of Variance
on Student Profile by Grade Level

| SOURCE | df | MS | F |
|---|---|---|---|
| Between Subjects | | | |
| Grade Level | 1 | .02 | .39 |
| Error | 445 | .05 | |
| Within Subjects | | | |
| Type of Statement | 1 | .02 | .35 |
| G X S | 1 | .22 | 3.17 |
| Error | 445 | .06 | |

No statistically significant differences were found in the type of comment written by the students at either grade level. Both junior and senior high students tended to write the same amount of both possibly helpful and non-helpful comments.

TABLE 4

Percentages Reflecting the Breakdown
of an Average Student Comment Section by Grade Level

| | Grade Level | |
|---|---|---|
| Category | Junior High | Senior High |
| MATCHES | 1.2% | 1.0% |
| PARAPHRASES | 36.0% | 37.0% |
| NON-HELPFUL | | |
| ELABORATIONS | 12.0% | 10.0% |
| DEFINITELY HELPFUL | | |
| ELABORATIONS | 0.3% | 0.0% |
| POSSIBLY HELPFUL | | |
| ELABORATIONS | 48.5% | 52.0% |

A look at Table 4 reveals the breakdown of the student profile by percentages. About fifty percent of each student's paper consisted of possibly helpful elaborations that could contribute to the making of recommendations for improvement. Only about 1% of the comments, at both grade levels, were exact matches of the objective survey items. The percentages for the paraphrased units, however, (38% for junior high and 37% for senior high) do tend to confirm that much of the material read during the content analysis was redundant and non-helpful.

An additional analysis addressing the degree of enhancement provided by the student comments was performed. A two-way repeated measures analysis of variance was calculated on the ratings of the four reports. An order effect was tested as the between measures effect. Grade levels were analyzed separately. The raters were asked to rate the degree to which the details of the summary reports added to the information presented in the quantitative summary of the objective items. A 5-point Likert scale ranging from not at all (1) to extremely (5) was used. The results of the analysis showed no significant order effect for either junior or senior high comparisons at the .05 level of significance ($F=.20$; $df=3/16$ for junior; $F=.12$; $df=3/16$ for the senior high). For the senior high, no statistically significant differences were found in the mean ratings comparing the amount of information added ($F=2.48$; $df=3/48$). For the junior high, although the overall F value was significant ($F=5.32$; $df=3/48$; $p<.01$), post hoc comparisons on the means comparing the systematic to the holistic content analysis showed no significant difference. A table of the mean ratings of the reports is presented in Table 5:

TABLE 5
Mean Ratings on Degree of Information Added
by Grade Level

| | Type of Content Analysis | | | |
|---|---|---|---|---|
| | Systematic | | Holistic | |
| | Report 1 | Report 2 | Report 1 | Report 2 |
| Grade Level | MEAN | | MEAN | |
| Junior High | 3.6 | 3.0 | 2.6 | 2.7 |
| Senior High | 3.1 | 2.5 | 2.5 | 2.5 |

The same type of statistical analysis was performed to investigate the adequacy of each report for providing information for recommending improvements. The results of this analysis show no significant order effect ($F=.18$; $df=3/16$ for the junior high; $F=1.22$; $df=3/16$ for the senior high). Although the overall F values for both grade levels do show significant differences ($F=8.69$; $df=3/48$; $p<.01$ for the junior high and $F=10.54$; $df=3/48$; $p<.01$ for the senior high), post hoc analyses are not significant on the contrasts comparing the systematic to the holistic reports. A table of mean adequacy ratings is presented below.

TABLE 6

Mean Adequacy Ratings by Grade Level

| | Type of Content Analysis | | | |
|---|---|---|---|---|
| | Systematic | | Holistic | |
| | Report 1 | Report 2 | Report 1 | Report 2 |
| Grade Level | MEAN | | MEAN | |
| Junior High | 4.2 | 3.2 | 3.6 | 3.0 |
| Senior High | 4.3 | 3.3 | 3.5 | 3.3 |

The rating scale on which the above means are based is:

1=highly inadequate
2=inadequate
3=slightly adequate
4=adequate
5=more than adequate.

All of the means fall between 3 ("slightly adequate") and 4 ("adequate"), with an overall mean of 3.6 for the systematic approach and 3.2 for the holistic approach. These results show that in the presentations of student comments analyzed from either approach, the written summaries of the analyses provide "slightly adequate" to "adequate" useful information in an evaluation context.

To investigate the relation of cost and time factors to type of approach, a hypothetical cost-effectiveness study is presented. Cost effectiveness, according to Levin (1983) refers to the "evaluation of alternatives according to both their cost and their efforts and their

alternatives according to both their cost and their efforts and their effects with regard to producing some outcome or set of outcomes"(p.17). Cost, for this study, is based on a range of three possible hourly fees that an evaluation consultant may charge. The effectiveness of the approach, therefore, changes according to the fee of the consultant. The measure of effectiveness is the sum of the average rating of "adequacy" and the average rating on the "amount of information added".

TABLE 7

Cost-Effective Analysis on Content Analysis Approach

Junior High

| Approach | Average Completion Time | Cost Per Hour | | | Effect Rating | C/E at | | |
|---|---|---|---|---|---|---|---|---|
| | | $20 | $40 | $60 | | $20 | $40 | $60 |
| Systematic | 18.0 hours | $360 | $720 | $1080 | 7 | 51 | 103 | 154 |
| Holistic | 3.0 hours | $ 60 | $120 | $180 | 6 | 10 | 20 | 30 |

TABLE 8

Cost-Effective Analysis on Content Analysis Approach

Senior High

| Approach | Average Completion Time | Cost Per Hour | | | Effect Rating | C/E at | | |
|---|---|---|---|---|---|---|---|---|
| | | $20 | $40 | $60 | | $20 | $40 | $60 |
| Systematic | 9.5 | $190 | $380 | $570 | 6 | 32 | 63 | 95 |
| Holistic | 3.25 | $ 65 | $130 | $195 | 6 | 11 | 22 | 33 |

An examination of the junior and senior high analyses shows a considerable difference in the cost-effectiveness of the two approaches to content analysis. In both cases, the holistic approach is more cost-effective, requiring the least cost per level of effectiveness. For example, while the systematic approach would cost $51 per one unit of effectiveness, the holistic approach would cost only $10. Given the almost equal ratings of effectiveness, the main factor contributing to the differences is the average completion time. At both grade levels, the time for completing the systematic approach is markedly greater. In addition, the effectiveness ratings for all cases indicate the presence of written summary reports that are both "slightly adequate" to "adequate" for providing information for the writing of recommendations and "moderately" add to the quantitative report of the objective survey items.

## Conclusions

The external validity of this study is limited to a narrowly focused set of conditions. First, the survey studied (i.e., High School Student Opinion Survey) was a comprehensive, well-tested instrument that encompassed a broad domain of student issues. Second, this study assessed the contribution of a small section of qualitative data to a predominantly objective-item survey. It did not assess an approach to content analysis where the majority of the items on the survey were open-ended. Third, the sample consisted of junior and senior high school students with average to above-average writing ability. And fourthly, the survey was administered in a needs assessment context; three additional surveys were administered to other groups (i.e., teachers, parents, administrators) in the district. This condition is especially relevant in that the breadth of the needs assessment contributed to the importance of the time and cost factors associated with the study. The overall quantity of data being analyzed necessitated an efficient allocation of time by the researcher in order to provide feedback in a timely fashion. The overall cost of the needs assessment was sufficient to warrant consideration of a cost analysis.

With these conditions in mind, the results of this study provide positive evidence to support the use of a less systematic approach to the content analysis of the qualitative data. Hypotheses were tested on the student data and on the summary reports written from the student data. We saw that approximately 50% of the students at both grade levels provided information that could be helpful for making improvements in the school system. On the other hand, approximately 50% of the information that was provided was either an exact match, a paraphrase, or a non-helpful elaboration of the objective items. These ambiguous data provide the first sign of evidence revealing a need to investigate the type of approach used in the analysis of the qualitative data. Although students were providing useful information, was the quantity of that information sufficient to warrant an in-depth, time-consuming, systematically-approached content analysis?

Other results support the contention that another method of content analysis (i.e., the holistic approach) may provide an equally valuable report of the data in a more cost-effective and timely fashion. A similarity comparison of the reports written from the systematically and holistically approached content analyses show the average ratings of similarity to be 2.7 across grade levels, indicating a rating close to "basically the same ideas presented" (3).

The total time difference involved in the preparation of the these reports is 20.75 hours, with the systematically approached analyses taking a total of 27.5 hours and the holistically approached analyses taking a total of 6.25 hours.

A look at the adequacy ratings of the reports show overall mean ratings of 3.6 for the systematic approach and 3.2 for the holistic approach, indicating that neither approach offers results that, by themselves, are adequate for recommending improvements. (A rating of 4 = "adequate".) The mean ratings on the degree of enhancement show a similar trend. The overall means for enhancement are 3.0 for the systematic approach and 2.6 for the holistic approach, indicating a "moderate" amount of enhancement was provided by the summary reports written using either approach.

And finally, the cost-effective analysis summarizes the findings of the study in terms of time, cost, adequacy, and enhancement. Although the systematic approach required more time to complete, the reports written from both approaches provided a "moderate" amount of enhancement to the objective-item report and were "slightly adequate" to "adequate" for providing information for the writing of recommendations. Considering the extra cost incurred for the systematically approached analysis and the lack of evidence of the superiority of that approach for providing useful evaluation information, it would appear that the use of a less rigorous approach to content analysis (i.e., a holistic approach) would be justified.

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